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Improving use of the confusion assessment method (CAM) in the intensive care unit: A quality improvement project to reduce delirium

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Improving Use of the Confusion Assessment Method (CAM) in the Intensive Care Unit: a Quality Improvement Project to Reduce Delirium

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Abstract

The purpose of this project was to implement an educational intervention to enhance the use of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) tool at an intensive care unit at a Northwest Arkansas hospital. The goal was for earlier diagnosis and treatment of delirium which research has indicated can impact more favorable patient outcomes. Delirium is an acute mental disturbance, which may have a fluctuating course (van Ejik et al., 2011). Delirium is common in the intensive care unit (ICU) but often goes unidentified causing delayed treatment (van Ejik et al., 2011). The Confusion Assessment Method (CAM) is an assessment tool used in the hospital setting to diagnosis delirium. The CAM-ICU has been adapted for use in the ICU allowing for the assessment of the critically ill and non-verbalizing patients (Boot, 2011). Although the CAM-ICU assessment tool was in use in a local Northwest Arkansas intensive care unit, the hospital felt that the CAM-ICU tool was not being fully utilized. Therefore, an educational intervention was created and delivered to intensive care unit nurses during a monthly staff meeting in order to increase utilization and accuracy of the CAM-ICU assessment tool. 100 patient charts from two months pre-education (September 1, 2014-October 31, 2014) and 100 patient charts from two months post-education (December 1, 2014-January 31, 2015) were reviewed. Data analysis demonstrated no significant difference between pre-education and post-education in CAM-ICU frequency, CAM-ICU scores or documentation of interventions. An educated nurse who can complete an accurate assessment to diagnosis and treat delirium is essential. The aim of this study was to answer the question: Will the CAM-ICU educational campaign affect the number of patients assessed with delirium?

Improving Use of the Confusion Assessment Method (CAM) in the Intensive Care Unit: a Quality Improvement Project to Reduce Delirium

Introduction

Delirium is a severe problem that is associated with increased mortality, prolonged mechanical ventilation, and prolonged hospital length of stay (Tomasi et al., 2012). Delirium is defined as "an acute disturbance of consciousness and attention with cognitive or perceptual changes and often a fluctuating course" (van Eijk et al., 2011, p. 340). Delirium is a syndrome of acute brain dysfunction resulting from multiple risk factors and can have a serious impact on patient outcomes (Zhang, Pan, Deng, Ni & Xu, 2014). Intensive care unit patients are at high risk for developing delirium due to multisystem acute illnesses, comorbidities, medications, and other environmental factors such as absence of visible daylight, isolation, limited visiting hours, the use of physical restraints, feeding tube, and catheters (Adamis et al., 2012). Other factors that can lead to delirium in the ICU: older age, hypoxia, electrolyte disorder, urinary retention, pain, sepsis, alcohol and medication withdrawal symptoms (Svenningsen & Tonnesen, 2011). Delirium has been proposed as an additional vital sign and it can often be the first sign of a change in clinical condition (Morandi et al., 2013).

Literature Review

The exact pathophysiology of delirium is currently undetermined. Delirium can have many different etiologies and one single factor does not usually cause the entire syndrome (Faught, 2014). Research suggests that delirium symptoms may be caused by drug toxicity, inflammation, or acute stress responses which contribute to disruption of neurotransmission (Faught, 2014). Delirium is thought to be associated with inflammatory response (Zhang et al.,

2014). The C-reactive protein has been found to be associated with the development of delirium (Zhang et al., 2014). C-reactive protein may be one part of a pathogenic cascade that has been associated with the vulnerability trait to "cause" a delirious state (Zhang et al., 2014). Even though a patient has a high level of C-reactive protein does not mean they will always develop delirium. Delirium is caused by multiple risk factors and many patients with high levels of C-reactive protein may not develop delirium due to other factors (such as young age and few comorbidities) which may help to protect them from developing delirium (Zhang et al., 2014). Neuropeptides, catecholamines, cortisol, and inflammatory markers have all been implicated in delirium pathophysiology (Faught, 2014).

There are three types of delirium that can manifest in a patient: hyperactive, hypoactive, and mixed delirium (Svenningsen & Tonnesen, 2011). Hyperactive delirium shows signs of restlessness, psychomotor hyperactivity, aggression and emotional liability (Svenningsen & Tonnesen, 2011). Alcohol withdrawal usually manifests as hyperactive delirium (Ely, 2002). Hypoactive delirium occurs when the patient is apathetic, lethargic, has slow psychomotor responses and has extended responses (Svenningsen & Tonnesen, 2011). Hypoactive delirium is difficult to identify and diagnose due to its similar clinical findings as depression (Faught, 2014). Hypoactive accounts for 94% of all cases (Svenningsen &Tonnesen, 2011). Mixed delirium consists of characteristics of both hyperactive and hypoactive delirium (Svenningsen & Tonnesen, 2011). Mixed delirium commonly occurs when a patient with hyperactive delirium is given a sedative medication (Zhang et al., 2014). Being aware of the three different types of delirium can help the nurse to identify the correct interventions to implement for the delirious patient. Findings from Swan (2014) indicate that education and development of nurses

understanding of delirium in the intensive care unit is key in the diagnosis and quick treatment of delirium.

Findings suggest that the use of certain sedating medications could contribute to delirium in individuals hospitalized for common medical conditions (Rothberg et al., 2013). Frequent fluctuations in the patient's sedation levels and disproportionate exposure to pain medications have been linked to a rise in the incidence of delirious states (Mansouri et al., 2013). In one study looking at medications received by patients who developed delirium, it was determined that patients who received the sedative Fentanyl were more likely to develop delirium (Svenningsen & Tonnesen, 2011). It was also found that benzodiazepines should be avoided as first-line medications in the pharmacologic management of delirium, as they can exacerbate delirium (Bush & Lawlor, 2015). Safer alternatives to sedatives should be considered as sedatives may have a low potential benefit and a high risk for harm (Rothberg, 2013).

For older adults over the age of 65 who are in the intensive care unit the incidence of delirium is 87% (Belanger & Ducharme, 2015). Advancing age has been associated as the first cause of developing delirium (Svenningsen & Tonnesen, 2011). Older adults are more likely to become delirious due to sensory deficits, early cognitive changes and changes in functional status (Faught, 2014). Delirium should not be confused with signs of early dementia in older adult patients, as dementia develops over years with a relatively stable yet chronic course (Faught, 2014). An older adult who has delirium will likely have a need for long-term care after hospitalization, which results in higher health care costs (Faught, 2014). One study showed that through the use of standardized protocols the number and duration of episodes of delirium in hospitalized older adults were significantly decreased (Svenningsen & Tonnesen, 2011).

The highest prevalence of delirium occurs in critically ill patients (Rivosecchi, Smithburger, Sev, Campell & Kane-Gill, 2015). Although delirium is common and has a significant impact on the patient, delirium in the intensive care unit often goes unidentified, delaying treatment (van Eijk et al., 2011). Without the use of a screening tool, around 65% of delirious patient-days in the intensive care unit are missed (Adamis et al., 2012). The Confusion Assessment Method (CAM) has been used to improve early identification of delirium (Boot, 2011). The CAM-ICU has been adapted for the intensive care setting and can be used to assess delirium in non-verbalizing critically ill patients who are intubated and mechanically ventilated (Boot, 2011). In several studies, the CAM-ICU revealed a high sensitivity with a range of 97%-100% and a high specificity with a range of 89%-100% (van Eijk et al., 2011).

The CAM-ICU assessment tool is easy to use and takes an average of 2-5 minutes to perform (Boot, 2011). The CAM-ICU yields one of three ratings: positive, negative, and unable to assess (UTA) (Swan, 2014). Before performing the CAM-ICU a patient's level of arousal should be determined as a comatose state precludes assessment with the CAM-ICU and should result in an unable to assess rating (UTA) (Swan, 2014). The CAM-ICU has four features: acute onset of fluctuating course, inattention, altered level of consciousness, and disorganized thinking (Boot, 2011).

The frequency of assessing every patient in the intensive care unit for delirium is recommended at least once per nursing shift or every 8-12 hours (Ely, 2002). In some critically ill patients the CAM-ICU may need to be performed more frequently as the patient's status changes (Adamis et al., 2012). It is important that nurses assess every intensive care patient for delirium. One problem of the CAM-ICU implementation was that nurses viewed the assessment tool as a task to be done rather than a tool to help the patient (Christensen, 2013). Another

problem discovered was that nurses viewed the CAM-ICU as overly complicated or difficult to undertake given time constraints around workload (Christensen, 2013). Performing the assessment itself is straightforward, leading researchers to believe the main problem with correct utilization of the CAM-ICU may be the decision-making process that occurs with differing subjective opinions of classifying delirium (Christensen, 2013). In one study, researchers found bedside nurses detected delirium during routine care in only 28% of the patients using the CAM-ICU (Swan, 2014).These problems can inhibit the accuracy and the correct utilization of the CAM-ICU and need to be addressed when educating nurses.

Awareness of how to utilize the CAM-ICU and importance of assessing and documenting scores is also critical in reducing delirium (Svenningsen & Tonnesen, 2011). Correctly diagnosing patients is important so that discussing complicated information or obtaining consent takes place in periods when the CAM-ICU score is negative (Svenningsen & Tonnesen, 2011). Delirium's reversal depends on the identification of treatable precipitants (Bush & Lawlor, 2015). Once delirium is diagnosed the underlying cause should be identified (Faught, 2014). Occasionally delirium may be the only initial manifestation of the underlying illness (Faught, 2014). Engaging the interdisciplinary team in discussions around the delirium assessments and facilitating the formation of an interdisciplinary plan of care is imperative to treating the patient with delirium (Dilibero, Ninobla, Woods & Moreira, 2014). The members of the multidisciplinary team treating the patient with delirium should include the nurse, provider, psychiatrist, pharmacists, case manager and patient representative (Faught, 2014).

Detecting delirium early has significant financial benefits. The patient cost of care with delirium is estimated to be increased by $2,500 (Faught, 2014). The average cost among hospitalized patients with delirium was more than 2.5 times greater than that of patients without

delirium (Brooks, Spillane, Dick & Stuart-Shor, 2014). Delirium is associated with an annual cost of $4 to $16 billion (Rivosecchi et al., 2015). Additional cost for a patient with delirium are related to a greater need for institutionalization, rehabilitation, and home care after discharge (Brooks, Spillane, Dick & Stuart-Shor, 2014).

Delirium is preventable in 30%-40% of patients (Faught, 2014). Multicomponent nonpharmacological interventions are effective for preventing and treating delirium (Bush & Lawlor, 2015). Interventions should not require longer than five to ten minutes per nursing shift to be accomplished (Rivosecchi et al., 2015). One way to prevent delirium is to use known risk factors for delirium and target interventions to patients who have these risk factors (Rivosecchi et al., 2015). Studies that included mobilization, noise-reduction, or sleep protocols displayed a benefit in the reduction of delirium (Rivosecchi et al., 2015). Encouraging the use of eye glasses and hearing aids while in the hospital also helps to improve orientation and safety (Faught, 2014). In order to maintain invasive lines, the nurse should seek the least confining method of restraint to meet the patient's needs (Faught, 2014). Providing a normal wake-sleep cycle and having access to natural light helps the patient stay oriented and decreases confusion (Faught, 2014). Effective pain management will allow the patient to be more mobile and help to maintain orientation (Faught, 2014). Nonpharmacological interventions to prevent and treat delirium is a low-risk, low-cost strategy that has the potential to decrease use of antipsychotics for the treatment of delirium (Rivosecchi et al., 2015).

Multicomponent protocols to decrease delirium haven been proven effective (Rivosecchi et al., 2015). Effective protocols included education of nurses and cognitive stimulation of the patient to promote reorientation to the environment (Rivosecchi et al., 2015). Education of nurses is an essential component of the success of any new intervention or initiative (Rivosecchi et al.,

2015). One strategy to eliminate nurses' resistance to reducing delirium is to educate nurses about the dangers of delirium, while stressing that patients become increasingly difficult to care for once delirious (Rivosecchi et al., 2015). The nurse must diminish the impact of delirium on the patient's comfort, safety and psychological equilibrium (Belanger & Ducharme, 2015). The nurse's role in helping the patient acknowledge what they are experiencing, offering explanations of the situation, showing understanding, providing support, seeking the reassuring presence of family, and talking with the patient about what they are experiencing are all interventions the nurse may perform to help a patient through a delirious episode (Belanger & Ducharme, 2015).

Methodology

This quality improvement project was conducted following approval of the University of Arkansas Institutional Review Board and the Northwest Arkansas hospital's quality management department. This research received funding from the Honors College at the University of Arkansas through the Honors College Undergraduate Research Grant. All patient information was de-identified as per the Health Insurance Portability and Accountability Act (HIPPA) guidelines. The identity of participating nurses was kept confidential

Design

The study design for this quality improvement project was a nonrandomized case –cohort study with an education intervention.

Setting

This study took place in the intensive care unit of a Northwest Arkansas hospital. The hospital provides not-for-profit care and is a progressive leader in health care in Northwest

Arkansas. The intensive care unit staffs specialized physicians, nurses and respiratory therapists. The intensive care unit employs approximately 40 nurses.

Subjects

The first phase of the study consisted of one 100 patients who had a hospital stay in the intensive care unit during the time period of September 1, 2014- October 31, 2014. The second phase of the study consisted of 100 patients who had a hospital stay in the intensive care unit during the time period of December 1, 2014 -January 31, 2015. The inclusion criteria for this study included: patients over the age of 18 and admitted to the intensive care unit during the two month time period. The only exclusion criteria for the study was patients who were in a comatose state.

Intervention

This study was conducted using two phases. The first phase of the study consisted of a chart review of 100 patients who were admitted to the intensive care unit during the two month time period of September 1, 2014 – October 31, 2014. A list was compiled of all patients who were admitted to the intensive care unit during two month time period. For the purpose of this study, the first 100 patients on the lists were selected patient charts were examined for CAM-ICU assessment frequency, CAM-ICU score, and documentation of interventions following a positive CAM-ICU score.

An educational intervention was developed and delivered to the intensive care unit nurses on delirium and correct utilization of the CAM-ICU assessment tool. This intervention included a 10 minute PowerPoint presentation at all four staff meetings in the month of November 2014. The staff meetings were attended by both night shift and day shift intensive care unit nurses.

Phase two included another chart review of 100 patients who were admitted to the intensive care unit during the two month time period of December 1, 2014 - January 31, 2015. A list was compiled of all patients who were admitted to the intensive care unit during the two month time period. The first 100 patients on the lists were selected. Charts were examined for CAM-ICU assessment frequency, CAM-ICU score and documentation of interventions following a positive CAM-ICU score.

Results

The data for this research was collected from intensive care unit patients during the months of September 1, 2014-October 31, 2014 and December1, 2014-January 31, 2015. The study consisted of 100 chart reviews prior to the educational intervention for nurses and 100 chart reviews after the educational intervention. Categories of data collected from the chart reviews were: age, gender, ethnicity, length of stay in the intensive care unit, completion of CAM-ICU, scoring of CAM-ICU (if performed), and documentation of interventions (if positive CAM-ICU score received). The data collected from pre-education and post-education were analyzed using a chi-square test of independence in order to identify relationships in the data.

The study consisted of a total of 200 patients, 100 pre-intervention and 100 post-intervention. Of the patients, 60.5% were male and 39.5% were female. The mean age of the patients in this study was 59 (Table 1). The average length of stay for patients in the intensive care unit was 4.17 days. The percentage of Caucasian patients in the study was 92.5%, Hispanic 3.5%, African American 3%, Asian 0.5%, and Native American 0.5% (Table 2).

A chi-square test for association was conducted between pre-education and post-education frequency of CAM-ICU assessment. If the CAM-ICU was performed once per shift,

twelve hours, for the patient's entire hospital stay, a "Yes" was recorded during data collection. If the CAM-ICU was not performed once per shift, twelve hours, then a "No" was recorded during data collection. This analysis did not reveal a significant difference between pre-education and post-education. X^2 (1, N=200), p = .500. These results can be seen in Table 3, Table 4 and Chart 1.

The next set of data, CAM-ICU scores, was analyzed using a chi-square for association between pre-education and post-education. If during the patient's length of stay in the intensive care unit they received a positive CAM- ICU score it was recorded as "Yes". If the patient did not receive a positive CAM-ICU at any time during the patient's length of stay in the intensive care it was recorded as "No". The recorded results for pre-education were: 86 "No" CAM-ICU scores, 14 "Yes" CAM-ICU scores. The recorded results for post-education were: 86 "No" CAM-ICU scores, 14 "Yes" CAM-ICU scores. This analysis did not reveal a significant difference between pre-education and post-education. X^2(1, N=200), p =.581. These results can be seen in Table 5, Table 6 and Chart 2.

Once a positive CAM-ICU score is recorded, documentation of interventions are to be recorded per hospital policy. If no documentation of interventions were found a "No" was recorded. If documentation of interventions were found then a "Yes" was recorded. Of the 14 positive CAM-ICU pre-education scores, 11 had no documentation of interventions and three had documentation of interventions. Of the 14 positive CAM-ICU post-education scores, 13 had no documentation of interventions and one patient presented with missing information. A chi-square test for association was conducted between pre-education and post-education documentation of interventions. This analysis did not reveal a significant difference between pre-

education and post-education. X^2 (1, N=27), p =.124. These results can be seen in Table 7, Table 8 and Chart 3.

Table 1
Age-range for CAM-ICU Patients

Age ranges	Frequency	Percent
<19	2	1.0
20-29	12	6.0
30-39	15	7.5
40=49	25	12.5
50-59	36	18.0
60-69	46	23.0
70-79	44	22.0
80+	19	9.5
9.00	1	.5
Total	200	100.0

Table 2
Ethnicity of CAM-ICU Patients

Ethnicity	Frequency	Percent
Caucasian	185	92.5
African American	6	3.0
Asian	1	.5
Native American	1	.5
Hispanic	7	3.5
Total	200	100.0

Table 3
Frequency of CAM-ICU assessment: Pre-education and Post-education

		Assessment Completion Every Shift		Total
		No	Yes	
Group	Pre-education	19	81	100
	Post-education	18	82	100
Total		37	163	200

Table 4
Chi Square Results of Frequency of CAM-ICU assessment

	Value	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.033[a]	.856		
Continuity Correction[b]	.000	1.000		
Likelihood Ratio	.033	.855		
Fisher's Exact Test			1.000	.500
Linear-by-Linear Association	.033	.856		
N of Valid Cases	200			

Chart 1
Frequency of CAM-ICU assessment: Pre-education and Post-education

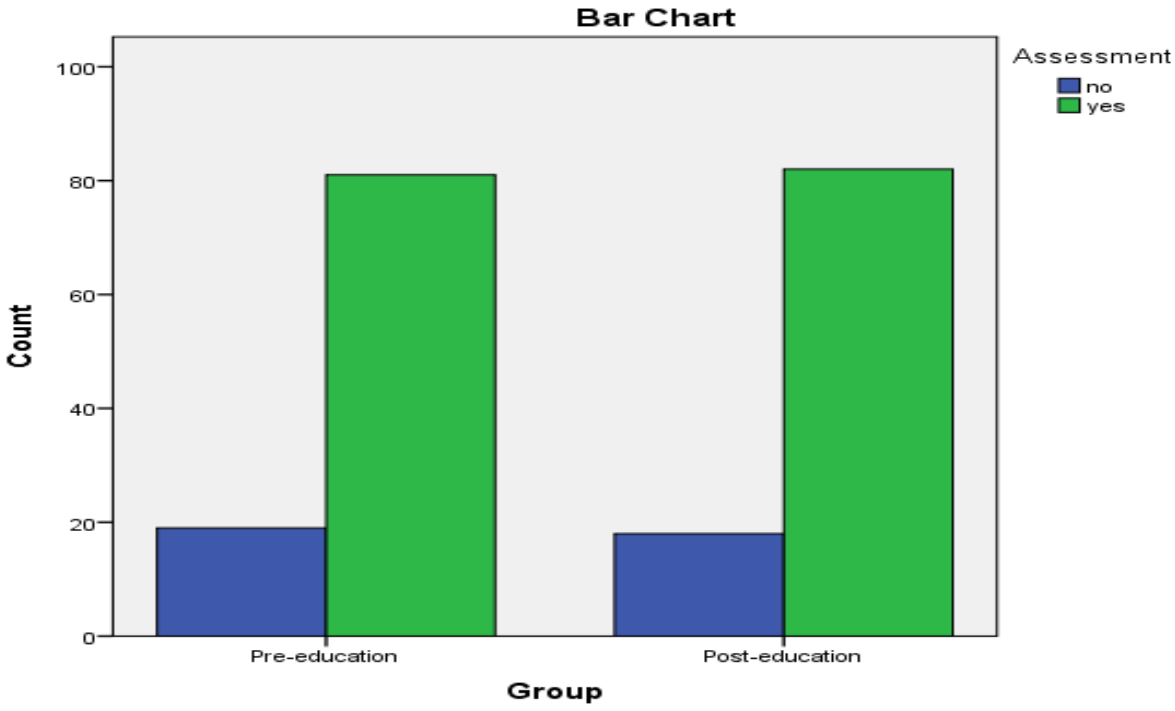


Table 5
CAM-ICU assessment Scores: Pre-education and Post-education

		Positive CAM-ICU Score		Total
		No	Yes	
Group	Pre-education	86	14	100
	Post-education	86	14	100
Total		172	28	200

Table 6
Chi Square Results of CAM-ICU assessment Scores

	Value	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.000[a]	1.000		
Continuity Correction[b]	.000	1.000		
Likelihood Ratio	.000	1.000		
Fisher's Exact Test			1.000	.581
Linear-by-Linear Association	.000	1.000		
N of Valid Cases	200			

Chart 2
Positive CAM-ICU assessment Scores: Pre-education and Post-education

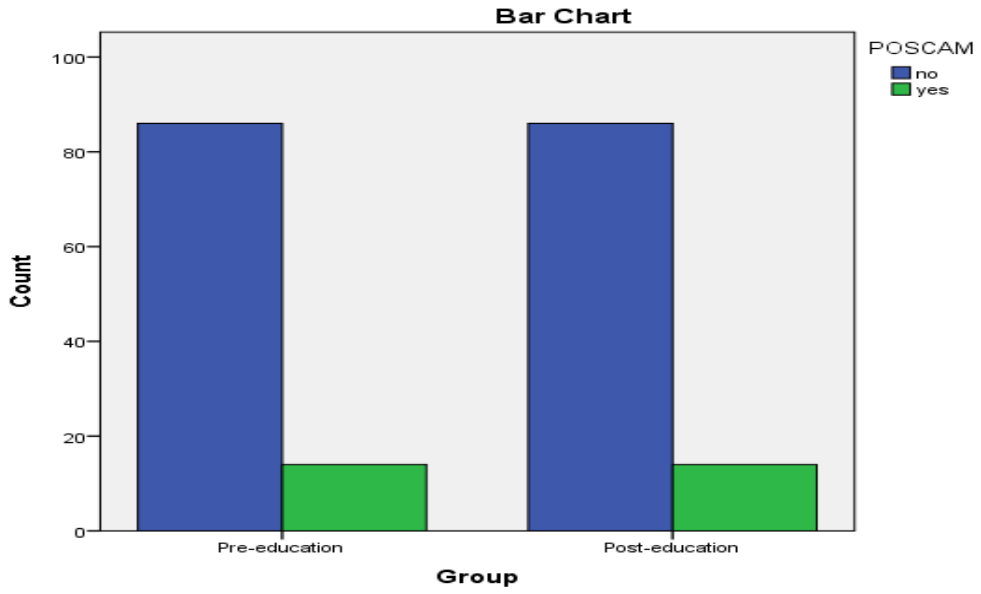


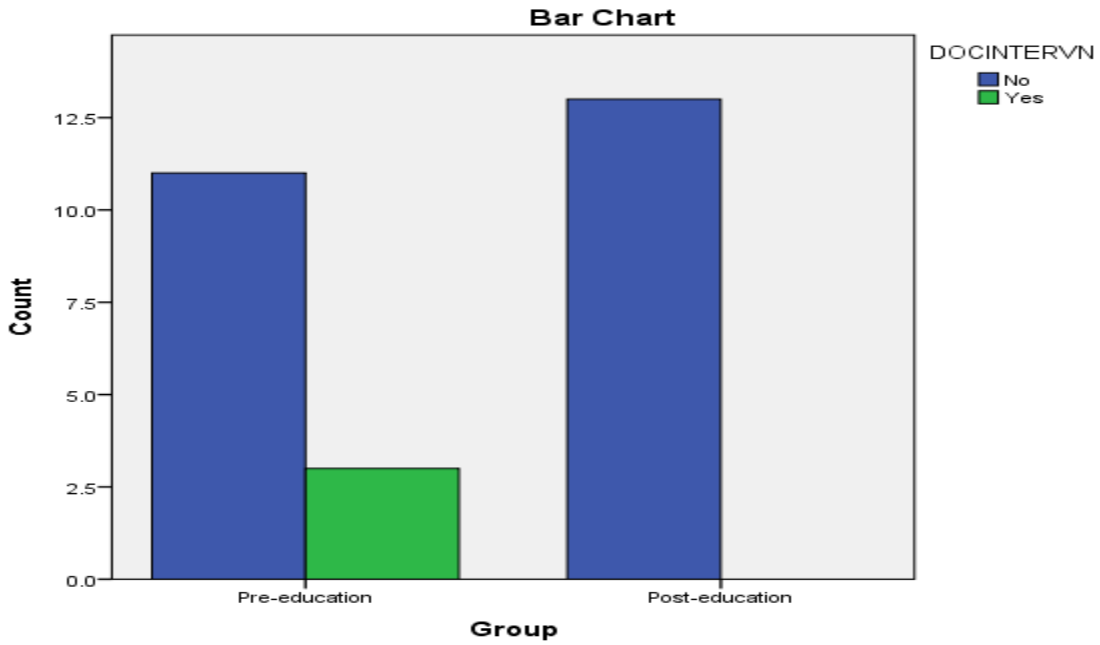
Table 7
Documentation for Interventions after Positive CAM-ICU: Pre-education and Post-education

		DOCINTERVN		Total
		No	Yes	
Group	Pre-education	11	3	14
	Post-education	13	0	13
Total		24	3	27

Table 8
Chi Square Results of Documentation for Interventions after Positive CAM-ICU

	Value	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.134[a]	.077		
Continuity Correction[b]	1.340	.247		
Likelihood Ratio	4.289	.038		
Fisher's Exact Test			.222	.124
Linear-by-Linear Association	3.018	.082		
N of Valid Cases	27			

Chart 3
Documentation for Interventions after Positive CAM-ICU: Pre-education and Post-education



Discussion

The results of this study were found to be not statistically significant. A correlation between pre-education data and post-education data was not found. Data analysis demonstrated no significant difference between pre-education and post-education in CAM-ICU frequency, CAM-ICU scores or documentation of interventions. This could have been due to factors such as the teaching method utilized or the nurses' attitudes toward the CAM-ICU assessment.

The teaching method used in this study consisted of a 10 minute PowerPoint presentation. The presentation consisted of information regarding: delirium, the correct utilization of the CAM-ICU assessment, current nurse led delirium protocol documentation, appropriate interventions for a positive CAM-ICU score, and the effects of early detection of delirium. Intensive care unit nurses were allowed to ask questions after the presentation. This method of teaching may have been more effective if other teaching techniques were used in combination. One study suggest using CAM-ICU rationale, detailed features, examples of situations that may cause confusion, critiques practice assessments, video examples, clear documentation and provision of an ongoing forum for discussion (Eastwood, Peck, Bellomo, Baldwin & Reade, 2012). Longer and more intensive CAM-ICU education may be needed to show significant results as CAM-ICU assessment frequency, score, and documentation of interventions rely on the nurses' knowledge of the assessment.

The nurses' attitude toward performing the CAM-ICU is key to its success. A nurse must understand the importance of diagnosing and treating delirium to fully utilize the CAM-ICU. If the nurse does not perceive the CAM-ICU to be a pertinent part of his/her assessment he/she is likely to not perform it correctly. The results of this study regarding assessment frequency, score, and documentation may have reflected the nurses' attitude toward the CAM-ICU assessment.

One strategy to eliminate nurses' hesitance to performing the CAM-ICU is educate nurses about the dangers of delirium, while stressing that patient's become increasingly difficult to care for once delirious (Rivosecchi et al., 2015).

In other studies barriers to correct usage of the CAM-ICU were found to be the time taken to make each assessment, attitudes of the staff and the nurses' personal confidence in performing the CAM-ICU assessment (Eastwood et al., 2012). The nurse's value of the CAM-ICU also creates a barrier to the correct utilization of the CAM-ICU. This barrier is dependent on a variety of factors, including, pre-existing attitudes regarding preferred technique for assessing delirium, the effectiveness of training, and the attitudes and actions of physicians when the told the results if the delirium assessment (Eastwood et al., 2012). These barriers should be acknowledged when reviewing the results of this study.

Limitations

This study has some important limitations that should be mentioned. First, it had a relatively small sample size of 200 patients. More significant results may have been concluded had there been a larger sample size. Second this study did not keep a record showing the percentage of intensive care unit nurses who attended the staff meetings in November when the educational campaign occurred. Therefore, these results may be indicative of a knowledge gap from nurse to nurse. The third limitation of this study was that a post-test to assess knowledge retention from the educational intervention was not implemented. The presentation was performed and nurses were allowed to ask questions, but a post-test was not implemented. This makes it impossible to know how much knowledge regarding the CAM-ICU was received by each nurse who attended the campaign. The fourth limitation of this study is the fact that only patient charts were reviewed. All data used for this study came from nurses' documentation. The

researcher was unable to assess the quality of the CAM-ICU assessment because the scope was limited to nurses' documentation. The CAM-ICU assessment may have been performed every shift but if it was performed correctly could not be evaluated due to data collection method used. Further, collecting data through chart reviews is difficult to evaluate if interventions were implemented once a positive CAM-ICU score was found. The nurse may have performed interventions to help reduce delirium once a patient received a positive CAM-ICU but may have failed to document this. This failure to document could have altered the results. The opposite may have occurred as well with nurses documenting interventions that were not performed.

Conclusion

Early detection of delirium has been associated with decreased hospitalization, decreased mechanical ventilation, decreased mortality and lower health-related costs (Tomasi et al., 2012). Nurse's early detection of delirium can lead to earlier diagnosis and treatment. An educational intervention consisting of a ten minute PowerPoint presentation on the CAM-ICU assessment did not reveal a significant difference between pre-education and post-education data. Data analysis demonstrated no significant difference between pre-education and post-education in CAM-ICU frequency, CAM-ICU scores or documentation of interventions. Further education may be needed to be provided on a continuous basis in order to fully educate intensive care unit nurses on the correct utilization of the CAM-ICU.

Recommendations for Practice

Intensive care unit nurses' understanding and successful utilization of the CAM-ICU is imperative for detecting delirium. Early detection of delirium can decrease hospitalization, decrease mechanical ventilation, decrease mortality and lower healthcare related costs. Hospitals

that implement the CAM-ICU should educate all of their intensive care unit nurses regularly on how to successfully complete a CAM-ICU assessment. Nurses should be educated and evaluated at multiple times throughout the year on their ability to perform the CAM-ICU assessment.

Recommendations for Further Research

Further research is needed to evaluate whether this educational intervention was effective in teaching intensive care unit nurses the CAM-ICU assessment. Further research is also needed to determine the best method of implementing an educational intervention regarding the CAM-ICU and how to best evaluate the results. A study that evaluates the quality of nurses' CAM-ICU assessment techniques would be beneficial as well.

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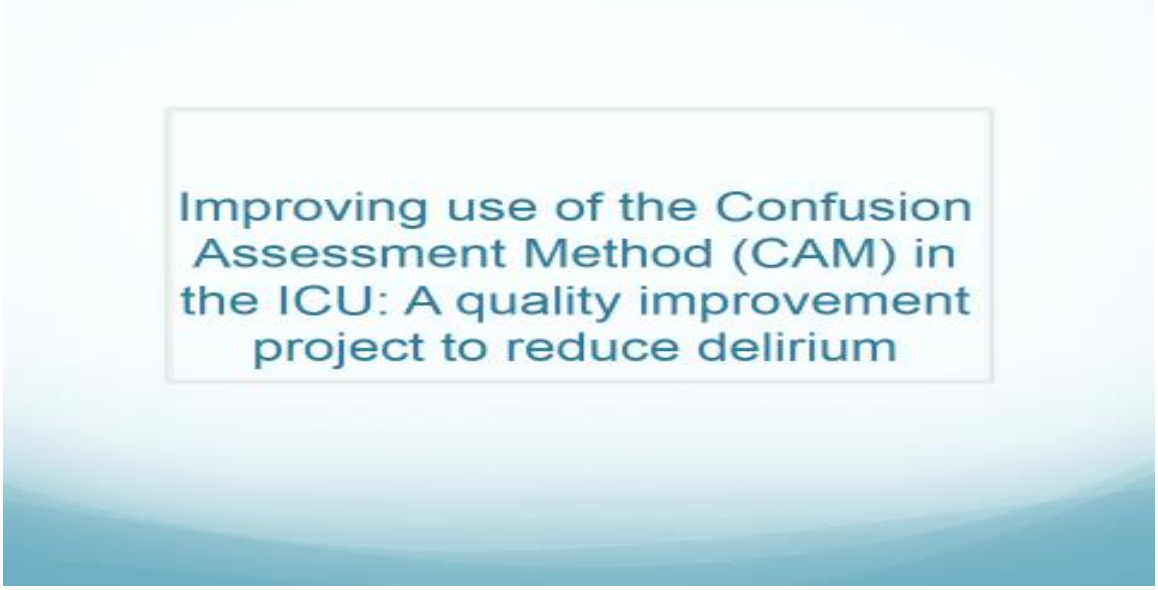
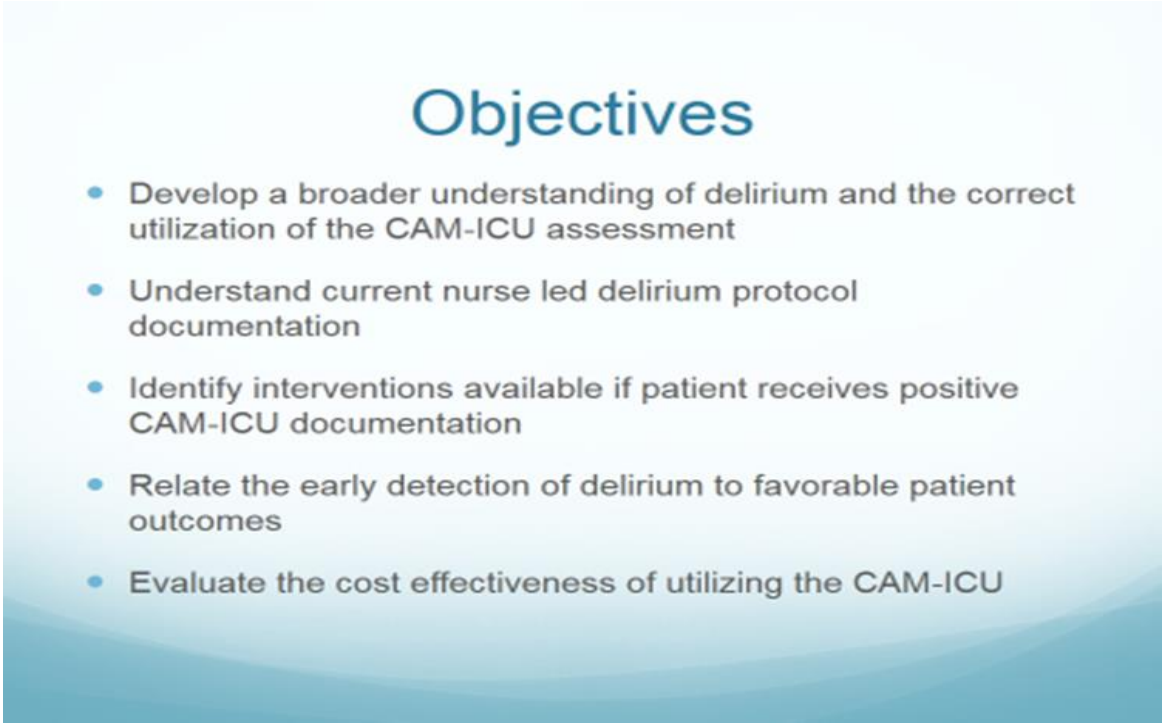
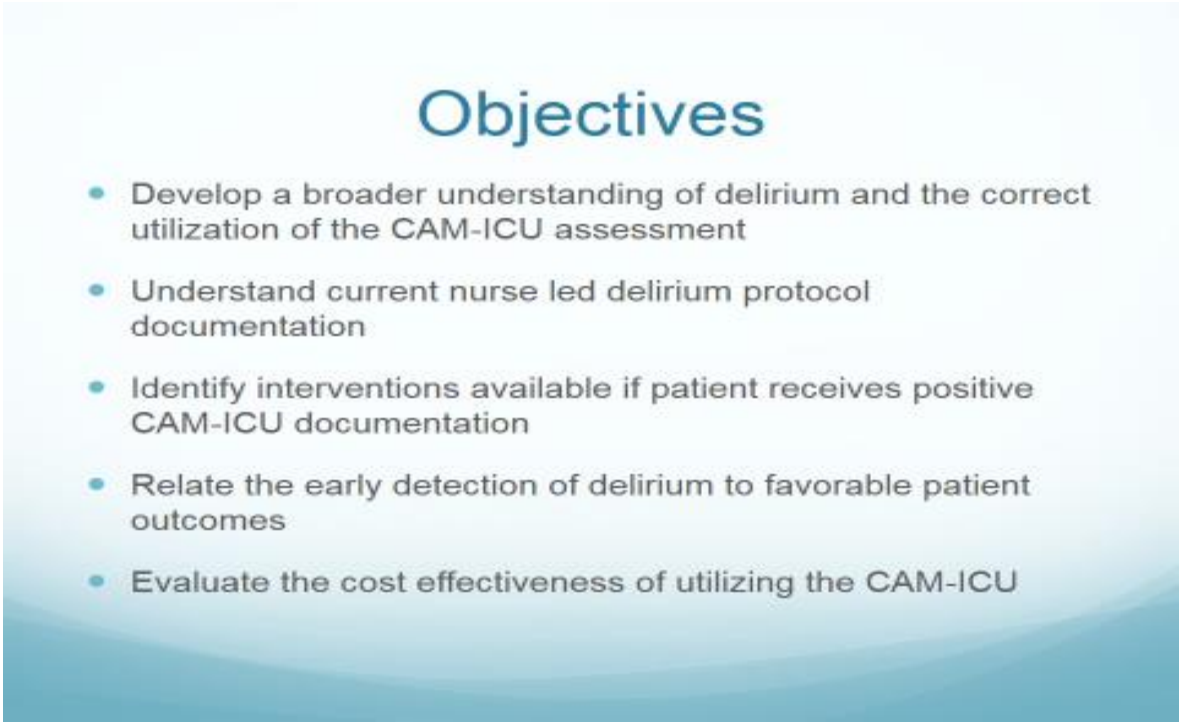
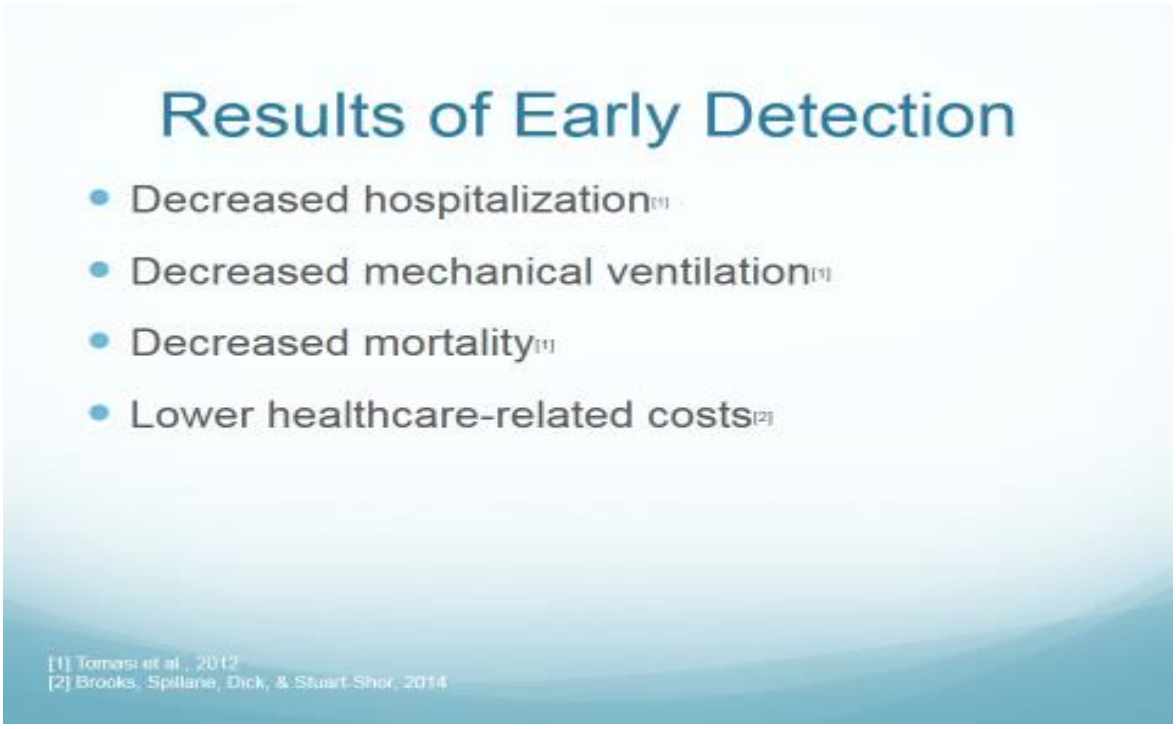
Appendix

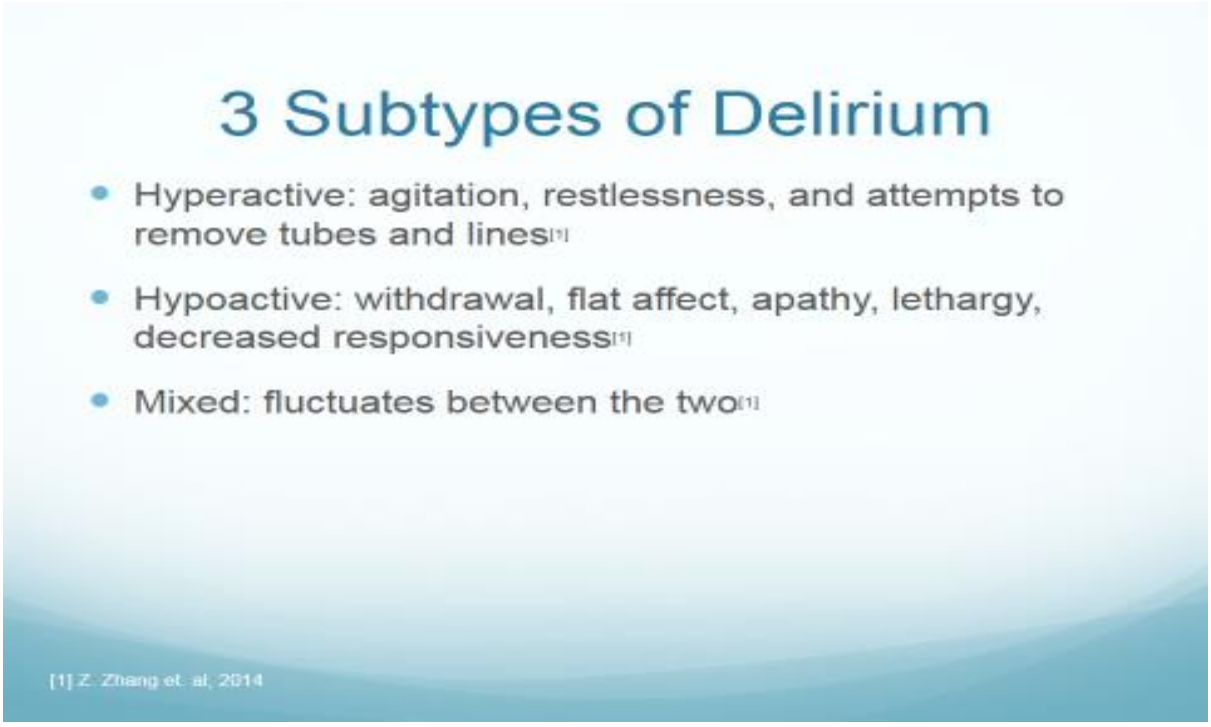
PowerPoint presented to intensive care unit nurses as part of educational intervention.

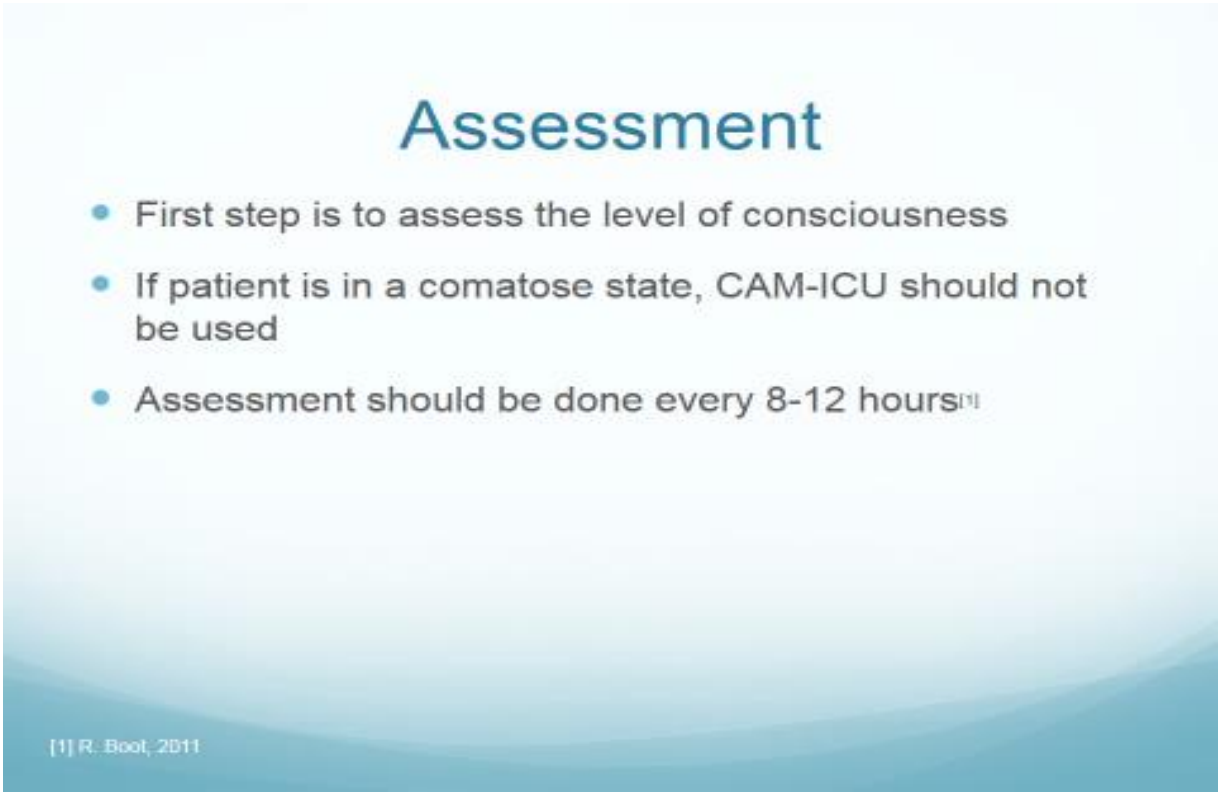


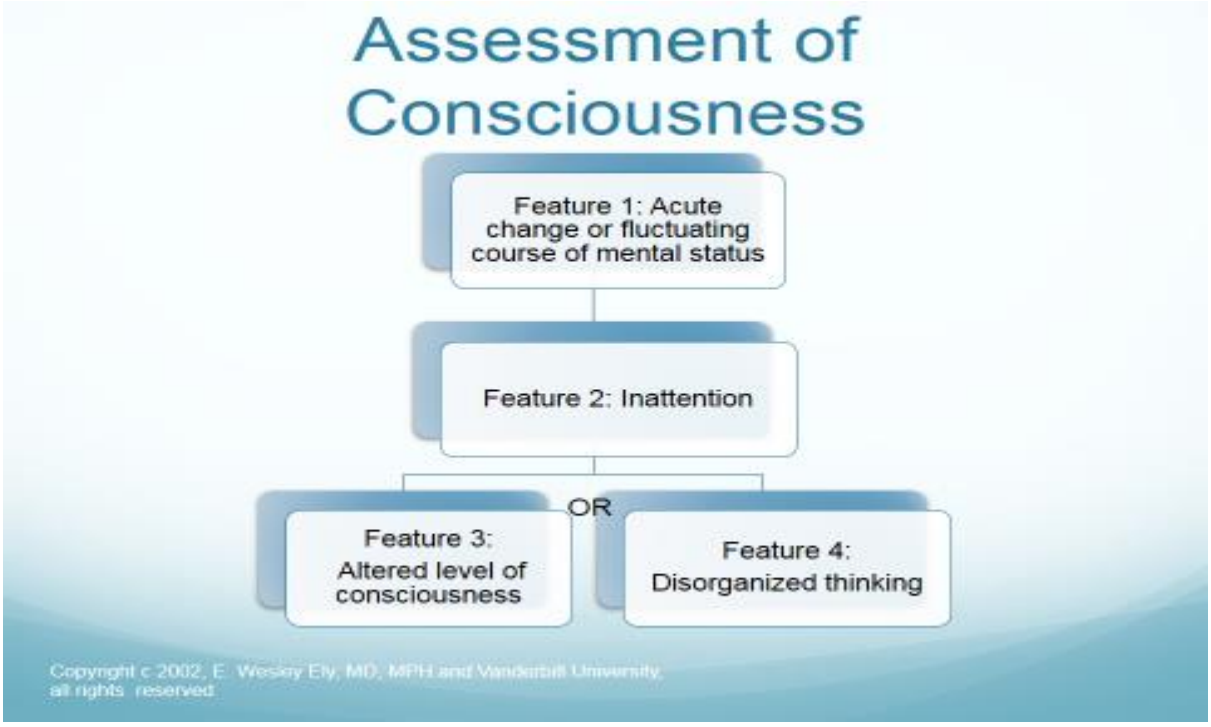



Objectives
Develop a broader understanding of delirium and the correct utilization of the CAM-ICU assessment
Understand current nurse led delirium protocol documentation
Identify interventions available if patient receives positive CAM-ICU documentation
Relate the early detection of delirium to favorable patient outcomes
Evaluate the cost effectiveness of utilizing the CAM-ICU


Results of Early Detection
Decreased hospitalization[1]
Decreased mechanical ventilation[1]
Decreased mortality[1]
Lower healthcare-related costs[2]
[1] Tomasi et al., 2012
[2] Brooks, Spillane, Dick, & Stuart Shor, 2014


3 Subtypes of Delirium
Hyperactive: agitation, restlessness, and attempts to remove tubes and lines[1]
Hypoactive: withdrawal, flat affect, apathy, lethargy, decreased responsiveness[1]
Mixed: fluctuates between the two[1]
[1] Z. Zhang et. al, 2014


Assessment
First step is to assess the level of consciousness
If patient is in a comatose state, CAM-ICU should not be used
Assessment should be done every 8-12 hours[1]
[1] R. Boot, 2011


Assessment of Consciousness
Feature 1: Acute change or fluctuating course of mental status
Feature 2: Inattention
OR
Feature 3: Altered level of consciousness
Feature 4: Disorganized thinking
Copyright c 2002, E. Wesley Ely, MD, MPH and Vanderbilt University
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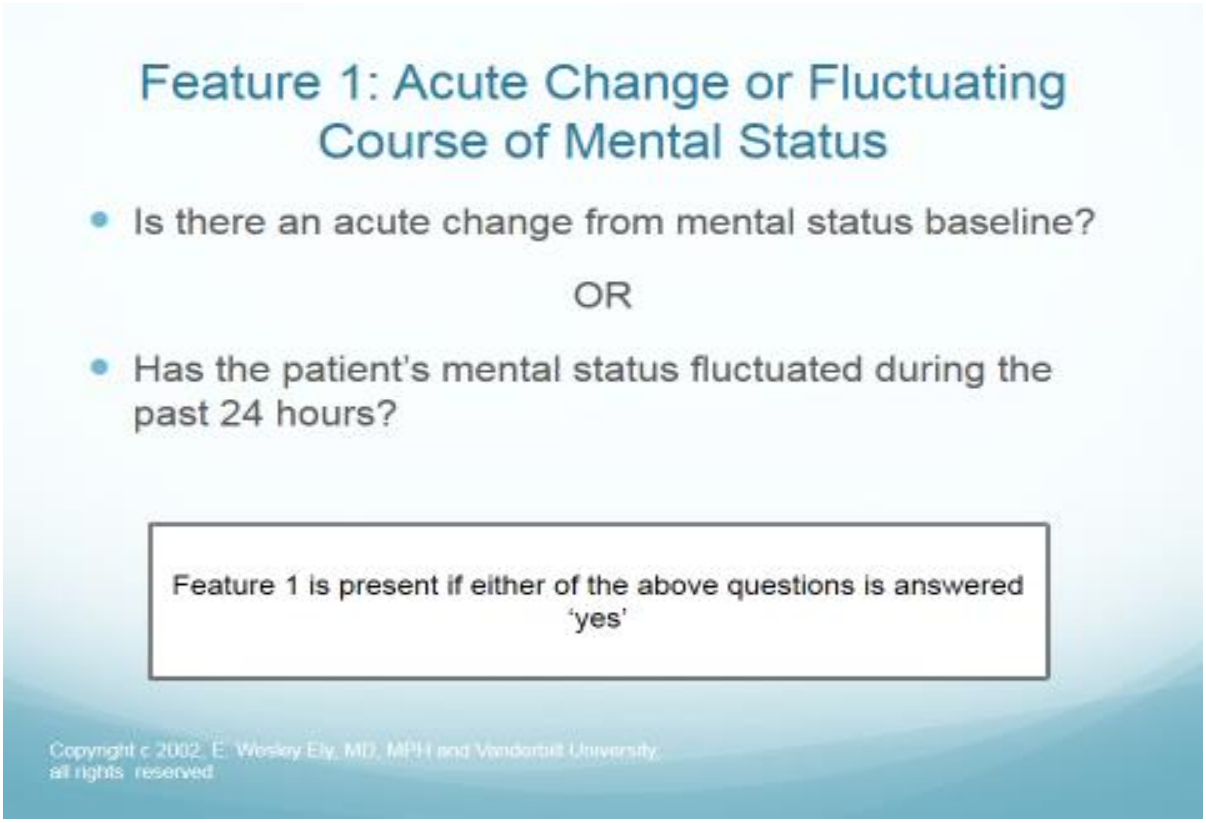
Feature 1: Acute Change or Fluctuating Course of Mental Status
Is there an acute change from mental status baseline?
OR
Has the patient's mental status fluctuated during the past 24 hours?
Feature 1 is present if either of the above questions is answered 'yes'
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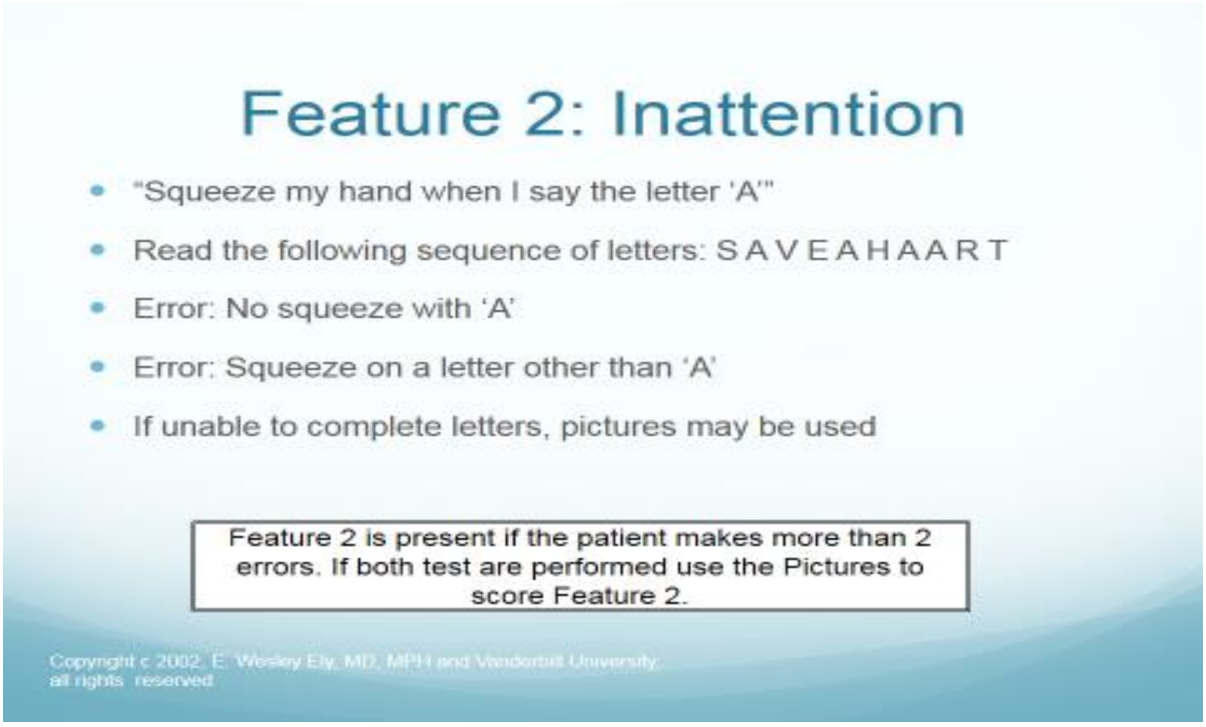
Feature 2: Inattention
"Squeeze my hand when I say the letter 'A'"
Read the following sequence of letters: S A V E A H A A R T
Error: No squeeze with 'A'
Error: Squeeze on a letter other than 'A'
If unable to complete letters, pictures may be used
Feature 2 is present if the patient makes more than 2 errors. If both test are performed use the Pictures to score Feature 2.
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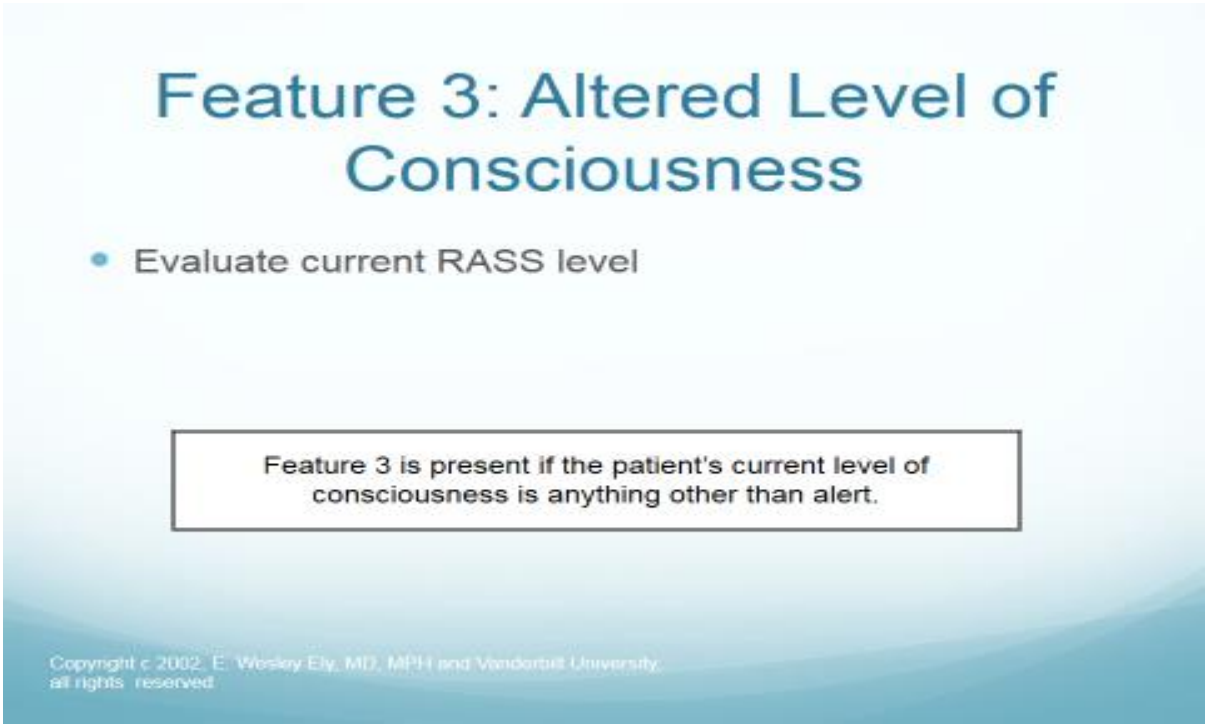
Feature 3: Altered Level of Consciousness
Evaluate current RASS level
Feature 3 is present if the patient's current level of consciousness is anything other than alert.
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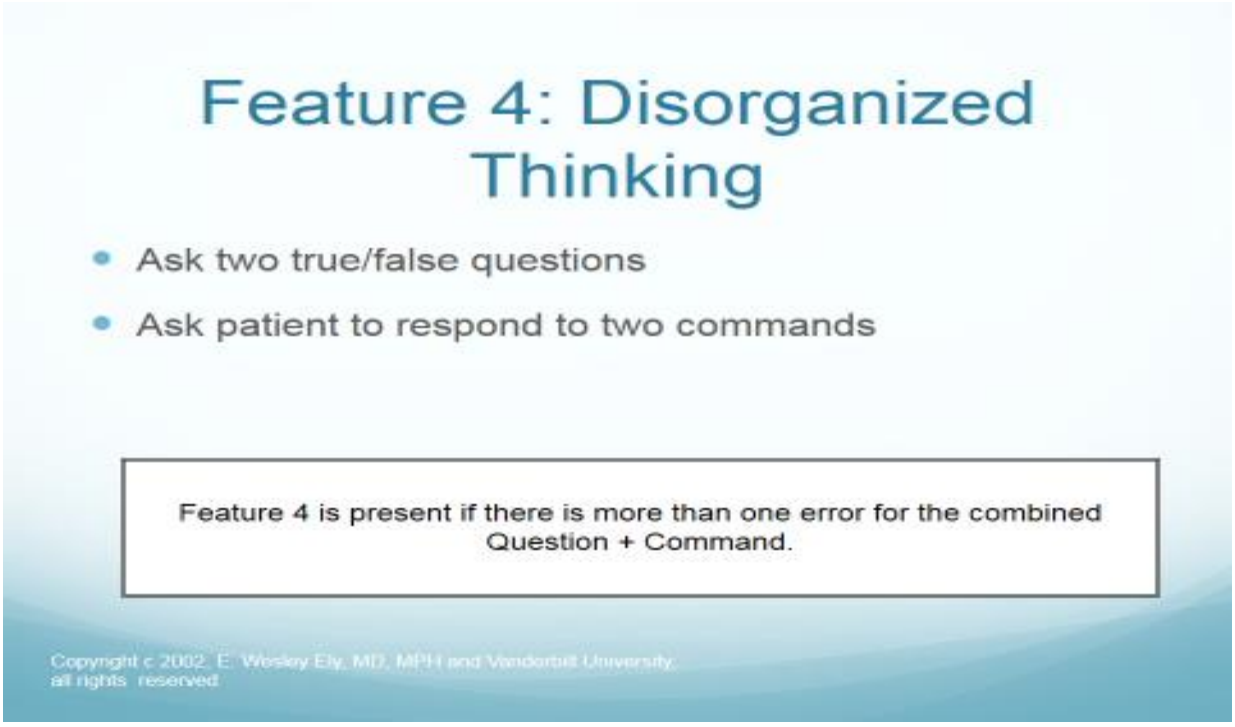
Feature 4: Disorganized Thinking
Ask two true/false questions
Ask patient to respond to two commands
Feature 4 is present if there is more than one error for the combined Question + Command.
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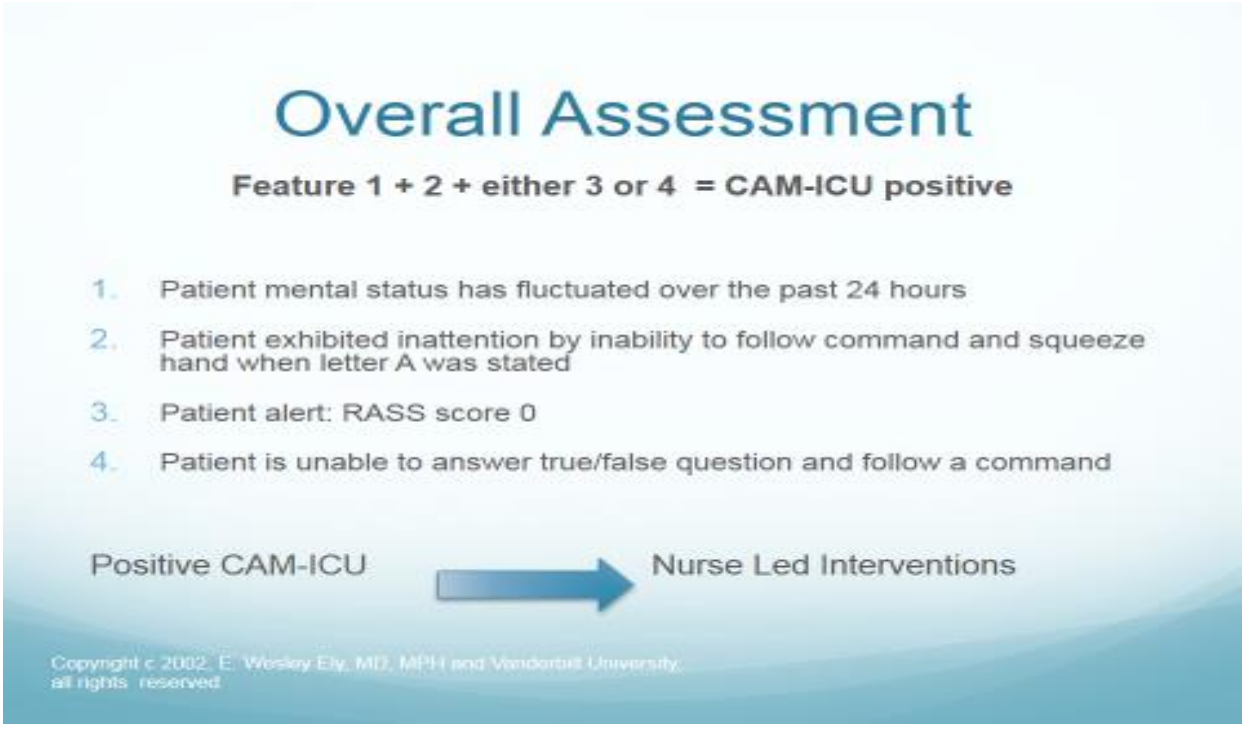
Overall Assessment
Feature 1 + 2 + either 3 or 4 = CAM-ICU positive
1. Patient mental status has fluctuated over the past 24 hours
2. Patient exhibited inattention by inability to follow command and squeeze hand when letter A was stated
3. Patient alert: RASS score 0
4. Patient is unable to answer true/false question and follow a command
Positive CAM-ICU
Nurse Led Interventions
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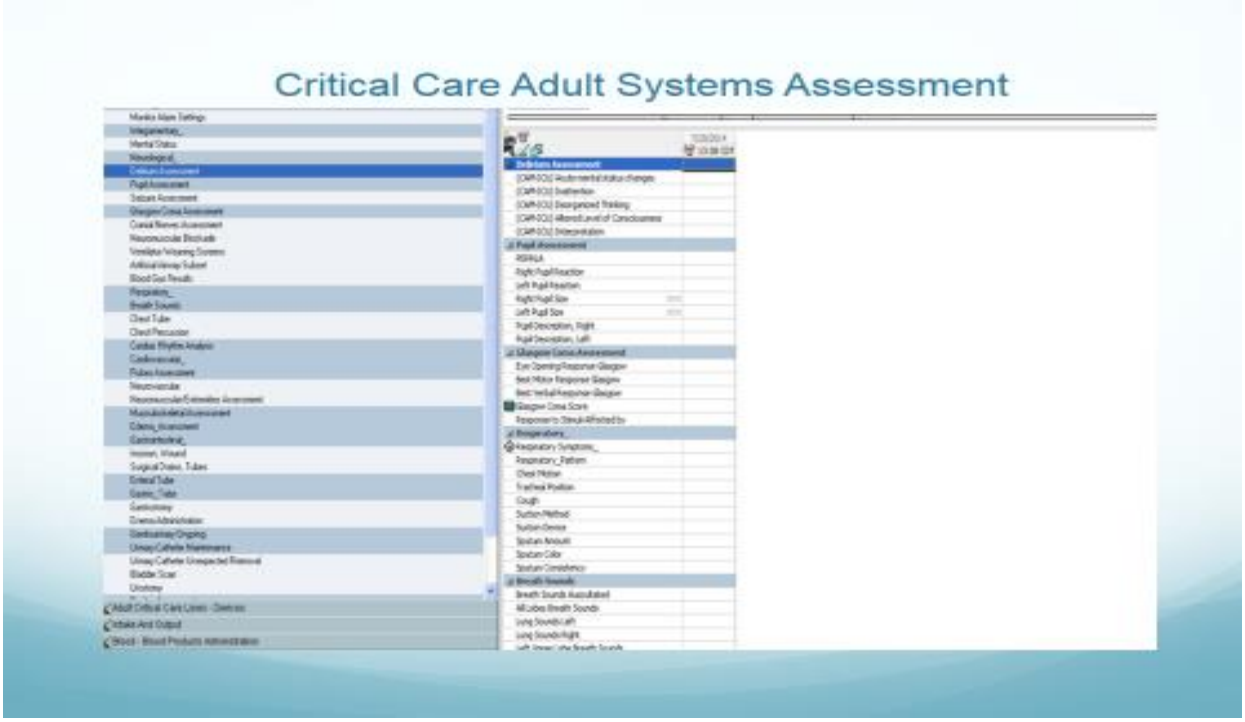
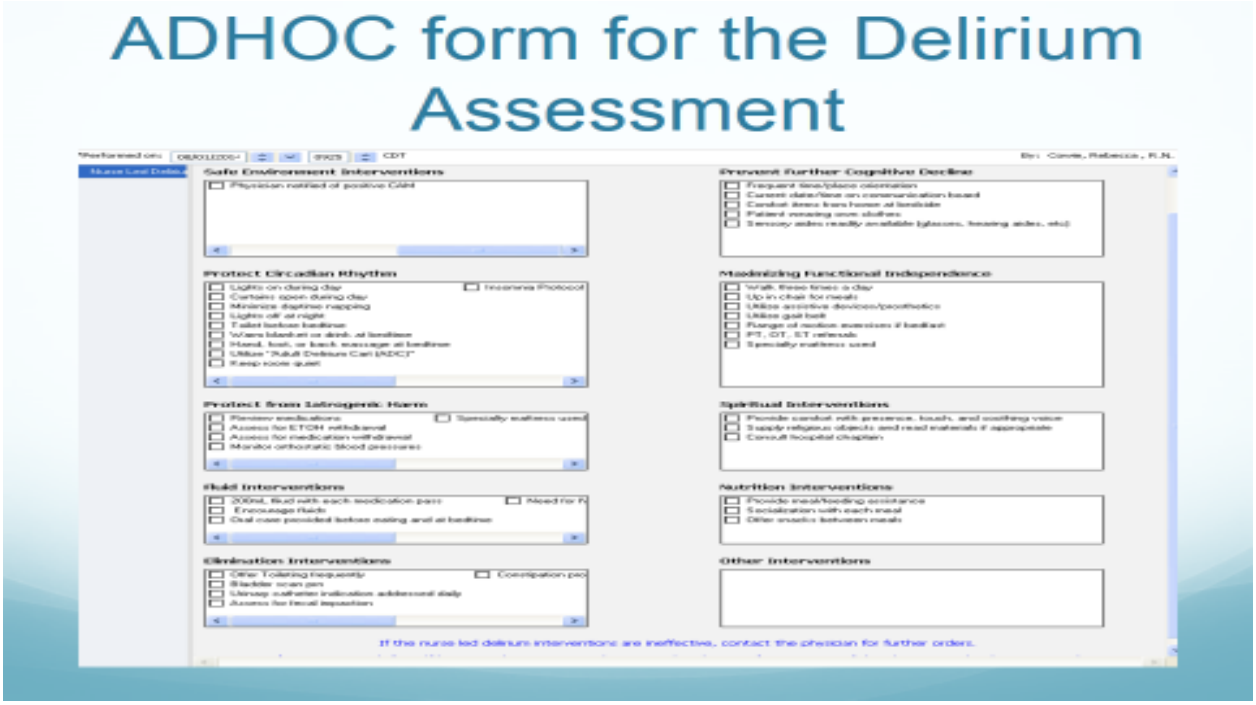
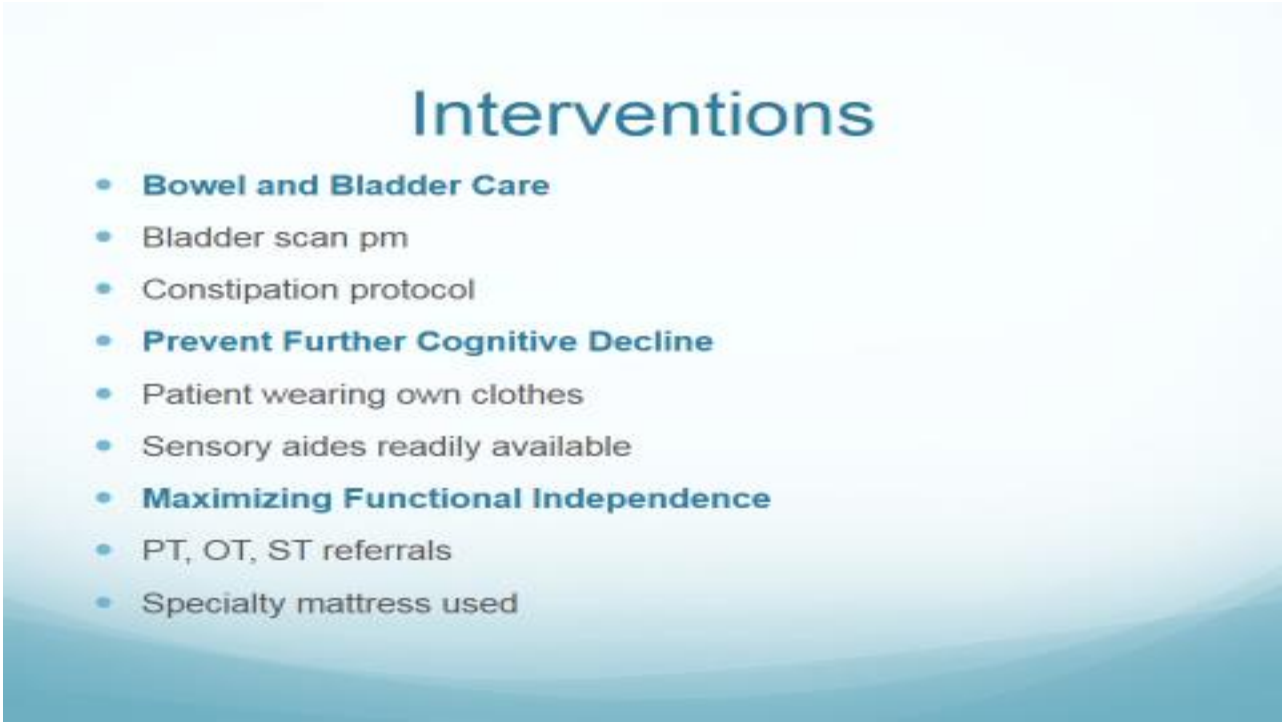
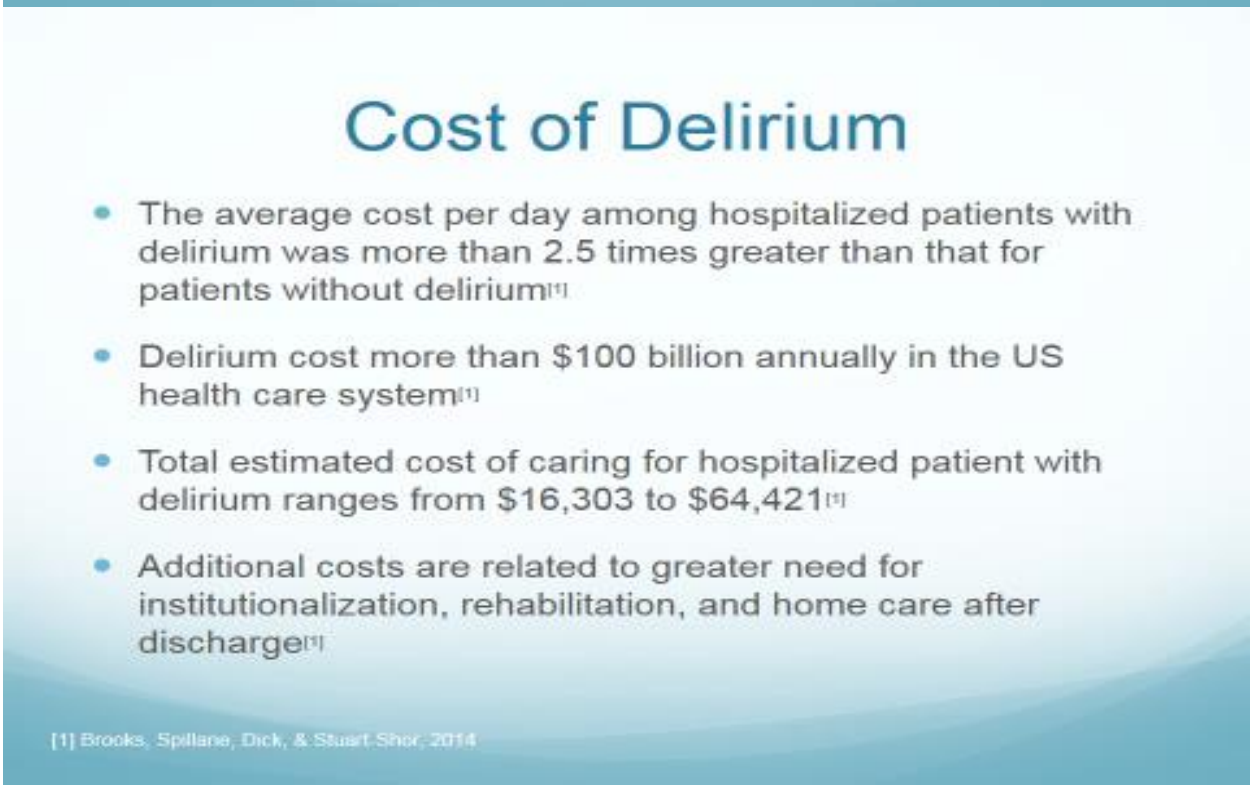

Critical Care Adult Systems Assessment


ADHOC form for the Delirium Assessment
Safe Environment Interventions
Prevent Further Cognitive Decline
Protect Circadian Rhythm
Maximizing Functional Independence
Protect from Iatrogenic Harm
Spiritual Interventions
Fluid Interventions
Nutrition Interventions
Elimination Interventions
Other Interventions
If the nurse led delirium interventions are ineffective, contact the physician for further orders.


Interventions
Safe Environment
Physician notified of positive CAM
Protect Circadian Rhythm
Utilize "Adult Delirium Cart"
Insomnia Protocol
Protect from Harm of Medical Treatment
Assess for ETOH withdrawal
Assess for medication withdrawal


Interventions
Bowel and Bladder Care
Bladder scan pm
Constipation protocol
Prevent Further Cognitive Decline
Patient wearing own clothes
Sensory aides readily available
Maximizing Functional Independence
PT, OT, ST referrals
Specialty mattress used


Interventions
Spiritual
Provide comfort with presence, touch and soothing
Supply religious objects and reading materials if applicable
Nutritional
Socialization with meals
Offer snacks before meals
Fluids
Encourage fluids


Cost of Delirium
The average cost per day among hospitalized patients with delirium was more than 2.5 times greater than that for patients without delirium[1]
Delirium cost more than $100 billion annually in the US health care system[1]
Total estimated cost of caring for hospitalized patient with delirium ranges from $16,303 to $64,421[1]
Additional costs are related to greater need for institutionalization, rehabilitation, and home care after discharge[1]
[1] Brooks, Spillane, Dick, & Stuart Shor, 2014

Nurse's Role

- Nurses are the first detectors of important clinical change, nurses may feel greater autonomy and advocacy for their patients in detecting brain dysfunction that may be missed without their assessment[1]

[1] Vasilevskis et al., 2011

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